

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

What is claimed is:

1. (Currently Amended) An ink-jet head for providing stable ink discharge, comprising:

a plurality of ink discharge units, each of said plurality of discharge units including:

a nozzle plate in which a nozzle that discharges ink is formed;

a pressure application section that applies pressure to ink and includes a diaphragm that moves relative to said nozzle plate, wherein said diaphragm moves in a direction approximately parallel to a discharge direction of an ink drop discharged from said nozzle; and

a nozzle plate holding member that holds said nozzle plate;

a head plate that holds ~~[[a]]~~ said plurality of ink discharge units composed of at least said nozzle plate and said pressure application section and said nozzle plate holding member;

a sealing member that seals a gap between each of said plurality of ink discharge unit units and said head plate so that air does not pass through and that elastically supports each of said plurality of ink discharge unit movably units with respect to said head plate ~~by itself being deformed;~~ and

a fixing member that fixes each of said plurality of ink discharge unit units and said head plate ~~after a gap between said ink discharge unit and said head plate is sealed by said sealing member and~~ so as to maintain alignment of said ink discharge unit with said head plate is performed.

2. (Currently Amended) The ink-jet head according to claim 1, wherein said fixing member fixes each of said plurality of ink discharge ~~unit~~ units to said head plate in an attachable and removable fashion.

3. (Currently Amended) ~~The~~ An ink-jet head ~~according to claim 1, wherein:~~ for providing stable ink discharge, comprising:

a plurality of ink discharge units, each of said plurality of discharge units including:

a nozzle plate in which a nozzle that discharges ink is formed;

a pressure application section that applies pressure to ink; and

a nozzle plate holding member that holds said nozzle plate;

a head plate that holds said plurality of ink discharge units;

a sealing member that seals a gap between each of said plurality of ink discharge units and said head plate so that air does not pass through and that elastically supports each of said plurality of ink discharge units with respect to said head plate; and

a fixing member that fixes each of said plurality of ink discharge units and said head plate so as to maintain alignment of said ink discharge unit with said head plate, wherein:

said head plate has an aperture part through which an ink drop discharged from at least one of said plurality of ink discharge ~~unit~~ units passes; ~~and~~ , and

ink repellence processing is performed on at least part of a surface of said head plate on a side of said head plate on which said ink drop is discharged.

4. (Currently Amended) ~~The~~ An ink-jet head ~~according to claim 1, wherein:~~ for providing stable ink discharge, comprising:

a plurality of ink discharge units, each of said plurality of discharge units including:

- a nozzle plate in which a nozzle that discharges ink is formed;
- a pressure application section that applies pressure to ink; and
- a nozzle plate holding member that holds said nozzle plate;

a head plate that holds said plurality of ink discharge units;

a sealing member that seals a gap between each of said plurality of ink discharge units
and said head plate so that air does not pass through and that elastically supports each of said
plurality of ink discharge units with respect to said head plate; and

a fixing member that fixes each of said plurality of ink discharge units and said head plate
so as to maintain alignment of said ink discharge unit with said head plate, wherein:

said head plate has an aperture part through which an ink drop discharged from at least
one of said plurality of ink discharge unit units passes; ~~and~~ , and

ink repellence processing is performed on ~~a side on which ink is discharged~~ of part of a
wall surface of said aperture part that is not in contact with said sealing member on a side of said
head plate on which said ink drop is discharged.

5. (Currently Amended) The An ink-jet head according to claim 1, further for providing stable
ink discharge, comprising:

a plurality of ink discharge units, each of said plurality of discharge units including:

- a nozzle plate in which a nozzle that discharges ink is formed;
- a pressure application section that applies pressure to ink; and
- a nozzle plate holding member that holds said nozzle plate;

a head plate that holds said plurality of ink discharge units;

a sealing member that seals a gap between each of said plurality of ink discharge units and said head plate so that air does not pass through and that elastically supports each of said plurality of ink discharge units with respect to said head plate;

a fixing member that fixes each of said plurality of ink discharge units and said head plate so as to maintain alignment of said ink discharge unit with said head plate; and

a temperature changing section that changes a temperature of said head plate[[:]] , wherein[[:]] ~~by changing a temperature of said head plate by means of~~ when said temperature changing section changes a temperature of said head plate, thermal expansion and contraction of said head plate ~~is caused~~ occurs, and spacing of said nozzles of said plurality of ink discharge units is maintained at a ~~desired~~ predetermined value.

6. (Currently Amended) The ink-jet head according to claim 5, wherein a temperature distribution is provided in a direction of a row of said nozzles of said plurality of said ink discharge units by said temperature changing section.

7. (Currently Amended) The ink-jet head according to claim 5, wherein pressure applied by said pressure application section ~~is changed~~ changes in accordance with [[:a]] the temperature of said head plate.

8. (Original) The ink-jet head according to claim 5, wherein said temperature changing section is a heater that generates heat through passage of electric current and is attached to said head plate.

9. (Original) The ink-jet head according to claim 8, wherein said heater has a heat generation distribution with respect to said head plate.

10. (Currently Amended) The ink-jet head according to claim 5, wherein each of said ink discharge ~~unit~~ units is fixed to said head plate in an attachable and removable fashion.

11. (Currently Amended) The ink-jet head according to claim 5, wherein each of said plurality of ink discharge units is provided with only one nozzle plate in which only one said nozzle is formed.

12. (Currently Amended) The ink-jet head according to claim 1, wherein~~[[:]]~~ said pressure application section further comprises~~[[:]]~~ ~~a diaphragm that moves relative to said nozzle plate;~~ and a piezoelectric element that drives said diaphragm, ~~and a direction of relative movement of said diaphragm is a direction approximately parallel to a discharge direction of an ink drop discharged from said nozzle.~~

13. (Currently Amended) An ink-jet recording apparatus comprising:

the ink-jet head according to claim 1; and

a nozzle pitch detection section that detects spacing of said nozzles of said ~~ink-jet head~~ plurality of ink discharge units.

14. (Currently Amended) ~~An ink-jet head manufacturing method that is a~~ A manufacturing method of the ink-jet head according to ~~Claim~~ claim 1, wherein:

said ink drop is discharged from each of said plurality of ink discharge units; and

alignment of each of said plurality of ink discharge ~~unit~~ units and said head plate is performed while discharging an ink drop from at least one of said plurality of ink discharge ~~unit~~ units and observing a state of flight of ~~[[an]]~~ the ink drop discharged from at least one of said plurality of ink discharge ~~unit~~ units.

15. (Currently Amended) ~~An ink-jet head manufacturing method that is a~~ A manufacturing method of the ink-jet head according to ~~Claim~~ claim 5, wherein when a temperature of said head plate during use of said ink-jet head is T1, and a nozzle pitch of said plurality of ink discharge units at said temperature T1 is P1, and ~~[[if]]~~ a nozzle pitch of said plurality of ink discharge units changes to P2 when ~~[[a]]~~ the temperature of said head plate is changed to ~~[[T1]]~~ T2 by said temperature changing section, alignment of each of said plurality of ink discharge ~~unit~~ units and said head plate is performed ~~with a temperature of said head plate at~~ so that ~~[[a]]~~ the nozzle pitch of said plurality of ink discharge units becomes P2 at said temperature T2.

16. (Currently Amended) ~~An ink-jet head manufacturing method that is a~~ A manufacturing method of the ink-jet head according to ~~Claim~~ claim 5, wherein alignment of each of said plurality of ink discharge ~~unit~~ units and said head plate is performed in a state in which said ink-jet head is maintained at a temperature at which said ink-jet head is ~~finally-used~~ operated by using said temperature changing section.